

## **The influence of date seed powder feeding on broiler performance**

**Rehab S.M. Abdalla<sup>1</sup>, I. I. Hamid<sup>2</sup>, A.A. Hamza <sup>2</sup>, M. A. Eltayeb<sup>3</sup>and  
A.M. El Hussein<sup>4</sup>**

<sup>1</sup>*Sudanese Nuclear and Radiological Regulatory Authority , Ministry of  
Higher Education and Scientific Research – Sudan*

<sup>2</sup>*Animal Production Research Centre (Kuku) – Sudan*

<sup>3</sup>*Sudan Atomic Energy Commission; Ministry of Higher Education and  
Scientific Research*

<sup>4</sup>*Central Laboratory; Ministry of Higher Education and Scientific Research – Sudan*

### **Summary:**

This study was conducted during October and December 2020 at the Animal Production Research Centre (APRC) to assess the effects of dietary inclusion of date seed powder (DSP) on the performance of broiler chickens reared for 35 days of age. Ninety broiler chicks (Arber Acres Hybrid) were used in the experiment. Birds were divided into 3 equal groups (30 birds/group) replicated 3 times with 10 birds per replicate and were randomly allocated to the experimental diets. Three broiler diets were formulated according to the nutrients requirements as outlined by NRC (1994), diet 1 was control (0.0 DSP), diet 2 (1% DSP) and diet 3 (2% DSP). All Diets were isocaloric and isonitrogenous. Feed intake, body weight gain and feed conversion ratio were recorded weekly. Organoleptic test of chicken meat was conducted at the end of the experiment. The obtained data were statistically analyzed by one way ANOVA using SPSS 22 program. The results showed that the diets containing 1 and 2 % DSP gave higher weight gains and better feed conversion ratio compared to the control, however feed intake was significantly not affected. Furthermore, broilers meat of the group fed 2% DSP showed the best sensory evaluation, regarding color, flavor, odor, juiciness, tenderness and the overall acceptability compared to the control and those fed 1% DSP.

It can be concluded that adding DSP up to 2 % in broiler diet will improve broiler performance and the taste of broiler meat.

*Keywords: date pits, broiler performance, panel test, final weight*

## **Introduction:**

Date palm is an important and one of the oldest trees cultivated by man. It has a good tolerance to cold and dry-hot climates. Date fruit have been found effective in constipation, inflammation, chemical induced toxicity, ulcer and hypertension. Date seeds constitute between 10 to 15% of date fruit weight and contain relatively high amount of protein (5.1g/100g) and fat (9.0g/100g) compared to date flesh. They are very rich source of dietary fibre (73.1g/100g), phenolic (3942mg/100g) and antioxidants (80400  $\mu\text{mol}/100\text{g}$  (Hussein *et al.*, 1998)). The date seed have been used traditionally as an animal feed or ground into smaller size and being roasted to turn it into caffeine-free coffee substitute. (Rahman *et al.*, 2007 and Al-Farsi and Lee, 2011). At present, date seeds are used mainly for animal feed. Utilization of such waste is very important as date seeds could potentially be considered as an inexpensive source of dietary fibre and natural antioxidants.

Ali *et al* (2016) compared control, Bio-Mos in broiler diets(0.1%),  $\beta$ -glucan (0.1%), 2%, 4% and 6% date crushed seeds groups. They found that, broiler groups in 2% and 4% date crushed seeds diets showed significantly higher weight gain and better feed conversion ratio in comparison to control group. The substantial enhancement of performance was attributed to the immunity, and antioxidant status induced by date seeds supplementation (Alfarsi *et al.*, 2007 and Ali *et al.*,2016)). On the other hand, Ali *et al.* (2018) replaced corn by 0, 5, 10 and 15% date pits in broiler ration during the periods 0–5 weeks of age. The results showed no significant differences in live body weight and feed intake between groups, however the group with corn gave significantly best feed conversion ratio compared to that of date pits groups. Tareen *et al.*( 2017) fed broiler chickens diets contained 0%, 1%, 2%, 3% and 4% levels of date palm kernel in balanced ration for 6 weeks. The authors found that, groups fed 3 and 4% date kernel showed significantly the lowest feed intake and the best growth weights and feed conversion ratio compared to 1 and 2% date kernel

## **Materials and Methods:**

### ***Experimental Site***

The experiment was carried out in a semi closed poultry house equipped with cages (1X1 m) at the Animal Production Research Centre (APRC) at Kuku, Khartoum North, Sudan. The house was cleaned, washed and disinfected then bedded with wood shavings before the arrival of the birds. The house equipments were thoroughly washed and disinfected. This

Date seed powder broiler performance experiment lasted for 5 weeks during October and December 2020, including the first week as adaptation period.

### ***Experimental diets***

The date seeds or kernels were collected from different Sudanese date varieties (Berkawi, gandilla, Tamouda, klmah, Mashreq Wad Khatib, Mashreq Wad Lagi) as a waste of date factory at Northern State of Sudan. Seeds mixtures were then ground at the Ministry of Minerals Laboratory using grinder (instrument Retsch 200). Samples of the date seeds powder (DSP) were taken for proximate chemical analysis to determine dry matter (DM), crude protein (CP), crude fiber (CF), Ether extract (EE) and NFE). The analysis was carried according to the methods outlined by AOAC (1995). Three experimental diets were formulated to meet the nutrients requirement for broiler starter and finisher as recommended by the National Research Council (NRC, 1994). Diet 1 (0.0% DSP) served as (control), while diet 2 and 3 contained 1% and 2% of DSP. All diets were isocaloric, isonitrogenous. Compositions and chemical analysis of the experimental starter and finisher diets are presented in table 1. All birds were fed a commercial pre starter diet (23% CP and 3000 Kcal kg ME) during the first week of age as adaptation period. Feed and water were offered *ad libitum* throughout the experiment.

### ***Experimental birds***

A total of 200 Arber acres Hybrid day old chicks were reared in a round metal enclosure provided with twenty four hours day light. At the beginning of the experiment chicks (90 in total) were arranged in a complete randomized design into three groups (30 chicks each), each group was further subdivided into 3 replicates with 10 chicks each. Broiler performance parameters of feed intake (FI), body weight gain (BWG) and feed conversion ratio (FCR) were recorded on weekly basis for each replicate. Twenty four hours day light was provided throughout the experimental period.

### ***Sensory evaluation***

At the end of the field experiment one broiler from each treatment was slaughtered, defeathered, eviscerated, cleaned and kept in a refrigerator. Samples were then taken from the thigh of the cold carcass for sensory evaluation. This test was carried out at the laboratory of Food Technology Department at APRC (Kuku) where samples were cooked in an oven at 180 C° for half an hour. The panelists were instructed to record their response

*ABDALLA, HAMID AND OTHERS*

for each attributed parameters (color, flavor, odour, juiciness, tenderness and the overall acceptability). A panel test sheet or chart was used for the evaluation of organoleptic parameters for each of the treatments, so that the number of panelists shared the same grade or degree for each of the parameters was calculated as percentage of the total number of panelists .The higher the percentage the higher the score of the panel tested parameters.

**Statistical Analysis**

The statistical measures were handled by the SPSS programming (IBM SPSS, 2012). One-way ANOVA was used. The means were separated using the Duncans(1955) New Multiple Range Test (Steel and Torrie, 1980).

**Table 1.**Composition and calculated analysis of the experimental broiler diets.

<b>Ingredients (%)</b>	<b>Starter diet</b>			<b>Finisher diet</b>		
	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>
Sorghum %	69.2	68.2	67.4	75.9	75.5	75.0
Broiler Concentrate%	5.0	5.0	5.0	5.0	5.0	5.0
Groundnut cake%	24.0	24.0	23.9	17.5	17.2	17.0
Ground seed date (DSP)	0.0	1.0	2.0	0.0	1.0	2.0
Lime stone%	1.0	1.0	1.0	1.0	0.8	0.5
Salt%	0.2	0.2	0.2	0.2	0.2	0.2
Methionine%	0.3	0.3	0.2	0.1	0.1	0.1
Vitamin premix%	0.1	0.1	0.1	0.1	0.1	0.1
Antimycotoxin%	0.2	0.2	0.2	0.1	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
<b>Chemical analysis (calculated)</b>						
ME/ Kcal/Kg	2978	2959	2943	3008	3000	3001
Crude Protein. %	22.3	22.3	22.3	20.0	20.0	20.0
Crude Fiber, %	4.2	4.2	4.2	3.7	3.7	3.7
Ether Extract, %	3.7	3.7	<b>3.7</b>	3.4	3.4	3.4
Calcium, %	1.1	1.1	1.1	1.1	1.1	1.0
Phosphorus %	0.67	0.67	0.67	0.66	0.66	0.66
Lysine, %	1.1	1.1	1.1	0.98	0.98	0.99
Methionine, %	0.71	0.71	0.71	0.54	0.54	0.54

## Results and discussion

### *Growth performance:*

The experimental data collected was tabulated and statistically analyzed. The effect of feeding date seed powder on weekly feed intake, body weight gain and feed conversion ratio are presented in table 2, 3 and 4. The results obtained for the whole period (2-5 week) are summarized in table 5. Table (2) shows result of the effect of the date seeds powder on the weekly feed intake. It showed no significant difference ( $p > 0.05$ ) in feed intake between treatments in 2<sup>nd</sup> and 4<sup>th</sup> experimental week, The result of the weekly live body weight gain was presented in table (3). It showed no significant difference ( $p > 0.05$ ) between treatments in the 2<sup>nd</sup> week of age. In general the results of weight gain in weeks 3, 4 and 5 were significantly ( $p < 0.05$ ) lower in the control group compared to the groups fed date seeds powder. Feed conversion ratio (FCR) was significantly better ( $p < 0.05$ ) by the groups fed date seed powder throughout the different experimental weeks compared to control except in the 4<sup>th</sup> week (Table 4). Results of the overall (2- 5 week) effect of date seed powder on the broilers performance parameters is summarized in table (5). Results showed no significant difference ( $p > 0.05$ ) among the dietary treatments in terms of feed intake, however, final body weight, body weight gain and feed conversion ratio were significantly ( $p < 0.05$ ) improved in the groups fed on 1 and 2% DSP compared to the control. The group fed 2% DSP gave significantly ( $p < 0.05$ ) the highest body weight gain.

The results of this study presented that the broiler performance in terms of body weight gain and feed conversion ratio was improved by the addition of date seed powder in feed compared to the control without effect on feed intake. This result agreed with the findings of Ali *et al.* (2016) who found that broilers fed 2% and 4% date crushed seeds showed significantly higher weight gain and the best feed conversion ratio in comparison to control. The obtained results were inconsistent with that of Tareen *et al.* (2017) who concluded that the high levels of date palm kernel (3-4%) significantly decreased broiler feed intake and increased live body weight gain compared to 1 and 2% date palm kernel groups. Al-Farsi and Lee (2011), Al-Farsiet *al.* (2007), Rahman *et al.*(2007) and Hussein *et al.* (1998) reported that date seeds are very rich source of antioxidants. This might be the reason of the improved broiler performance by the addition of date seed powder in this study. This suggestion was supported by Ali *et al.*, (2016) and Alfarsiet *al.* (2007) who also attributed the improved performance of broilers to the antioxidant and immune-stimulant constituents of palm date.

**Table 2.**Effect of Date Seed Powder on feed intake (g/bird/week) (mean  $\pm$  SD).

Treatment	Weeks			
	Wk1	Wk2	Wk3	Wk4
0 DSP	196.47 $\pm$ 0.50	343.40 <sup>a</sup> $\pm$ 6.04	438.00 <sup>b</sup> $\pm$ 5.37	630.40 $\pm$ 1.22
1% DSP	196.60 $\pm$ 0.72	344.67 <sup>a</sup> $\pm$ 1.65	444.67 <sup>b</sup> $\pm$ 10.20	631.67 $\pm$ 2.89
2% DSP	196.33 $\pm$ 0.58	332.80 <sup>b</sup> $\pm$ 2.95	465.00 <sup>a</sup> $\pm$ 13.23	630.73 $\pm$ 1.27
LS	NS	*	*	NS

LS = Level of Significance: NS =Not Significant: \* =Significant (p< 0.05)

**Table 3.**Effect of Date Seed Powder on body weight gain g/bird/ week (mean  $\pm$ SD).

Treatment	Weeks			
	Wk1	Wk2	Wk3	Wk4
0 DSP	190.89 $\pm$ 23.38	264.20 <sup>ab</sup> $\pm$ 6.96	277.40 <sup>b</sup> $\pm$ 18.39	296.50 <sup>c</sup> $\pm$ 39.98
1% DSP	220.75 $\pm$ 13.20	258.17 <sup>b</sup> $\pm$ 21.62	317.03 <sup>a</sup> $\pm$ 9.51	428.33 <sup>b</sup> $\pm$ 32.32
2% DSP	206.30 $\pm$ 1.26	290.67 <sup>a</sup> $\pm$ 7.46	287.70 <sup>b</sup> $\pm$ 4.81	501.27 <sup>a</sup> $\pm$ 6.01
LS	NS	*	*	*

LS = Level of Significance: NS =Not Significant: \* =Significant ( p < 0.05)

**Table 4.**Effect of Date Seed Powder on feed conversion ratio (g Feed / g gain) (mean  $\pm$  SD).

Treatment	Weeks			
	Wk1	Wk2	Wk3	W4
0 DSP	1.04 $\pm$ 0.14	1.30 <sup>b</sup> $\pm$ 0.05	1.58 <sup>b</sup> $\pm$ 0.08	2.15 <sup>b</sup> $\pm$ 0.31
1% DSP	0.89 $\pm$ 0.06	1.34 <sup>b</sup> $\pm$ 0.12	1.40 <sup>a</sup> $\pm$ 0.02	1.48 <sup>a</sup> $\pm$ 0.11
2% DSP	0.95 $\pm$ 0.01	1.15 <sup>a</sup> $\pm$ 0.04	1.62 <sup>b</sup> $\pm$ 0.03	1.26 <sup>a</sup> $\pm$ 0.01
LS	NS	*	*	*

LS = Level of Significance: NS =Not Significant: \* =Significant ( p < 0.05)

Date seed powder broiler performance

**Table 5.**Effect of Date Seed Powder on the overall (2-5 week) performance (mean  $\pm$  SD).

Treatment	Final body weight g/bird	Total feed intake g/bird	Total weight gain g/bird	Feed conversion ratio (g feed/g gain)
0 DSP	1184.00 <sup>c</sup> $\pm$ 17.7	1608.27 $\pm$ 1.2	1029.99 <sup>c</sup> $\pm$ 15.8	1.52 <sup>b</sup> $\pm$ 0.04
1% DSP	1379.67 <sup>b</sup> $\pm$ 19.6	1617.60 $\pm$ 9.0	1224.28 <sup>b</sup> $\pm$ 20.2	1.28 <sup>a</sup> $\pm$ 0.02
2% DSP	1442.33 <sup>a</sup> $\pm$ 4.2	1624.87 $\pm$ 13.6	1285.94 <sup>a</sup> $\pm$ 12.8	1.24 <sup>a</sup> $\pm$ 0.01
LS	*	NS	*	*

LS = Level of Significance: NS =Not Significant: \* =Significant (  $p < 0.05$ )

**Sensory evaluation:**

From the result of the panel test it can be summarized that; most of the panelists stated that meat color was extremely light, very light and moderate light for the birds fed 1% , 0% and 2% DSP respectively. Aroma of meat of broiler fed the control diet and those 2% DSP was very intense, on the other hand, it was moderately intense for birds fed 1% DSP .The panelists recorded that meat flavour was very intense by all different groups. Results show that, broiler meat of birds fed 2% DSP was extremely juicy compared to other groups, while the meat of birds fed 1 and 2% DSP were extremely tender than that of the control.

From the result of the sensory evaluation it can be noted that, meat of broilers fed 2% DSP scored the best preferred colour, flavour, odour, juiciness, tenderness and overall acceptability compared to the control and those fed 1 % DSP.

**Conclusions:**

From the result of this research it can be concluded that adding 1 and 2 % DSP in broiler diets will improve broiler performance and the taste of broiler meat, however, the meat taste of broiler fed 2% DSP was more preferred than that of 1% DSP.

**References:**

- Al-Farsi, M., and Lee, C. Y. (2011).** Usage of date (*Phoenix dactylifera* L.) seeds in human health and animal feed. *Nuts and Seeds in Health and Disease Prevention*. **447–452.**
- Al-Farsi, M.; Alasalvar, C.; Al-Abid, M.; Al-Shoaily, K.; Al-Amry, M. and Al-Rawahy, F. (2007).** Compositional and functional characteristics of dates, syrups, and their by-products. *Food Chemistry*, **104: 943-947.**
- El-Far, A. H.; Ahmed, H. A. and Shaheen, H. M. (2016).** Dietary Supplementation of *Phoenix dactylifera* Seeds Enhances Performance, Immune Response, and Antioxidant Status in Broilers. *Oxid Med Cell Longev*. 2016, Article ID 5454936.  
[http://dx.doi.org/10.1155/2016/5454963.](http://dx.doi.org/10.1155/2016/5454963)
- Hammod, A.J.; Ali, N. A.; Alkassar, A. and Jameel, Y. J. (2018).** The effect of Partial Replacement of Maize by Date Pits on Broiler Performance. *Journal of Pure and Applied Microbiology*, **12(2):807-813.**
- AOAC (1995).** Official methods of analysis, 15 edition: Association of Official Analytical Chemists, Washington, DC, USA.
- Duncan, D. B. (1955).** Multiple range test and multiple F-tests. *Biometrics*, **11:1-42.**
- Hussein, A.S.; Alhadrami, G.A. and Khalil, Y.H. (1998).** The use of dates and date pits in broiler starter and finisher diets. *Bioresource Technology*, **66:219–223.**
- IBM SPSS (2012).** IBM SPSS Statistics for Windows, Version 21.0 Armonk, NY: IBM Corp., USA.
- NRC (1994).** Nutrient Requirements of Poultry. National Research Council, National Academy Press, Washington, D. C, 9<sup>th</sup> Revised Edition.
- Rahman, M.S.; Kasapis, S.; Al-Kharusi, N.S.Z.; Al-Marhubi, I.M. and Khan, A.J. (2007).** Composition, characterization and thermal transition of date pits powders. *Journal of Food Engineering*, **80:1–10.**
- Steel, R. G. D. and Torrie, J. H. (1980).** Principles and Procedures of Statistics, Second Edition, New York: McGraw-Hill.



Date seed powder broiler performance

**Tareen M. H.; Wagan, R.;Siyal, F. A.;Babazadeh, D.; Bhutto, Z. A.;  
Arain, M. A. and Saeed, M. (2017).**Effect of various levels of  
date palm kernel on growth performance of  
broilers.*VeterinaryWorld*,**10 (2):227-232.**  
[www.veterinaryworld.org./volum\\_10\\_feb.2017/4pdf](http://www.veterinaryworld.org./volum_10_feb.2017/4pdf).

**Authors**

**Rehab Salih Mohmoud Abdalla**

**Ibrahim Ismail Hamid ; E-mail:[hamidnaile@hotmail.com](mailto:hamidnaile@hotmail.com).**

**Atif Abdelrauof Hamza**

**Mohammed Ahmed Hassan Eltayeb**

**Abdelrahim Mohamed El Hussein ; E-mail: [abdelhussein@hotmail.com](mailto:abdelhussein@hotmail.com).**

*ABDALLA, HAMID AND OTHERS*